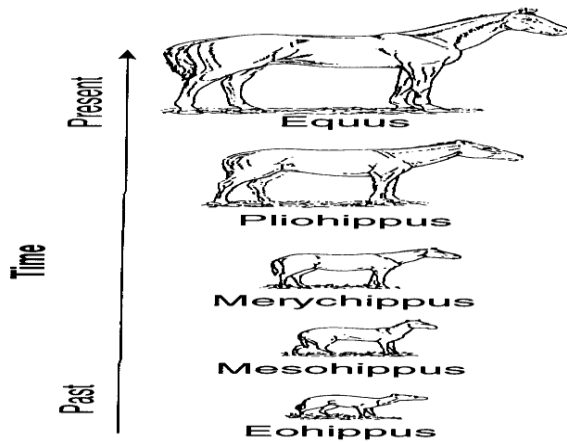


Changes in species over geologic time is called \_\_\_\_\_.



List three sources of genetic variability in living things.

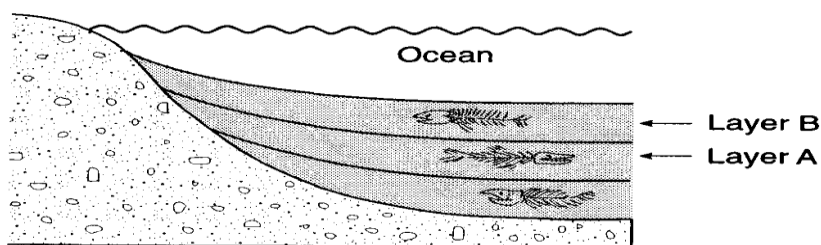
- a.)
- b.)
- c.)

3.1c New inheritable characteristics can result from new combinations of existing genes or from mutations of genes in reproductive cells.

List factors which can increase the incidence of gene mutations.

Only mutations in \_\_\_\_\_ are passed on to the offspring.

Many places in the \_\_\_\_\_ record show a gradual transition between species in the rock layers. The fossils get \_\_\_\_\_ and more \_\_\_\_\_ as one moves up the sedimentary rock layers.



Explain the evolution of longer necks in the giraffe using the terms overproduction, finite resources, variation, and natural selection.

overproduction\_\_\_\_\_

variation\_\_\_\_\_

finite  
resources\_\_\_\_\_

survival of the fittest \_\_\_\_\_

List three sources of genetic variability:

a.) \_\_\_\_\_ is a change in the DNA of an organism

b.) \_\_\_\_\_ is the exchange of pieces of chromosomes in meiosis  
which ensures that all gametes made by a sexually reproducing organism will  
be different

c.) \_\_\_\_\_ is the mixing of genes in the offspring by the combination  
of traits from the Mother and the Father.

\_\_\_\_\_ variations tend to survive changes in the environment while

\_\_\_\_\_ variations tend to become extinct over time.

Increased \_\_\_\_\_ means more individuals within a species will be  
able to survive changed environmental conditions.

Give an example of the above situation. \_\_\_\_\_

\_\_\_\_\_

Give two different adaptations used by organisms to ensure reproductive success.

\_\_\_\_\_

\_\_\_\_\_

Give an example of a behavior used by humans to enhance reproductive success.

\_\_\_\_\_

Small changes over generation that would accumulate over time would need to be \_\_\_\_\_ adaptations which better suit an organism for \_\_\_\_\_.

What is a niche?

Unicellular organisms first appeared about \_\_\_\_\_ billion years ago.

Multicellular organisms first appeared about \_\_\_\_\_ billion years ago.

Why would some organisms change little over millions of years?

Why would some organisms die out over time?

\_\_\_\_\_ of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to allow its survival.

Fossils indicate that many organisms that lived long ago are \_\_\_\_\_.

What is biodiversity?

What is adaptation?

How do favorable and unfavorable adaptations in a species influence the evolution of those variations?

Do insects and bacteria mutate because a pesticide or antibiotic is added to their environment?

What do we mean by a selecting agent and how does it influence evolution?

Why have insects and bacteria been able to evolve so rapidly?

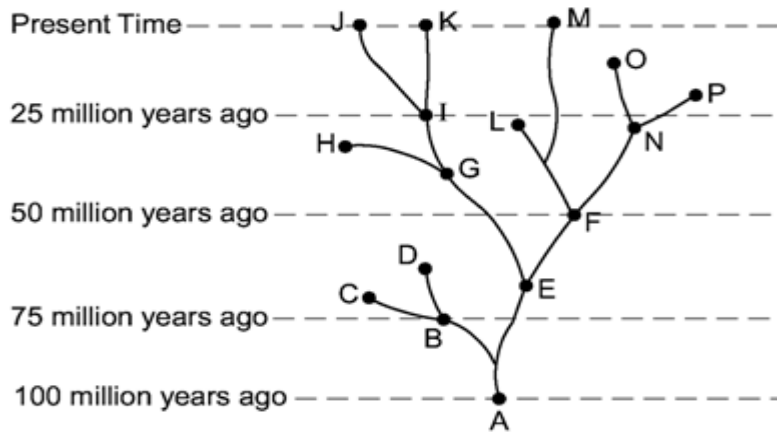
\_\_\_\_\_ similarities are a weaker basis for classifying organisms than biochemical similarities like similarities in DNA, enzymes, hormones, or proteins.

The more similar the \_\_\_\_\_, the more similar the \_\_\_\_\_, the more similar the \_\_\_\_\_ making up the organisms and the more \_\_\_\_\_ they are related.

Organisms are classified based on their \_\_\_\_\_ relationships.

A \_\_\_\_\_ is able to successfully reproduce amongst its members.

Branching tree diagrams (cladograms) are often used to show \_\_\_\_\_ relationships.



In the diagram above identify the following:

1. What is the common ancestor of all these organisms? \_\_\_\_\_
2. Is J and K or J and M more closely related? Justify your answer.

3. What is the common ancestor of K and M? \_\_\_\_\_

4. Which organisms in this cladogram have become extinct? \_\_\_\_\_